

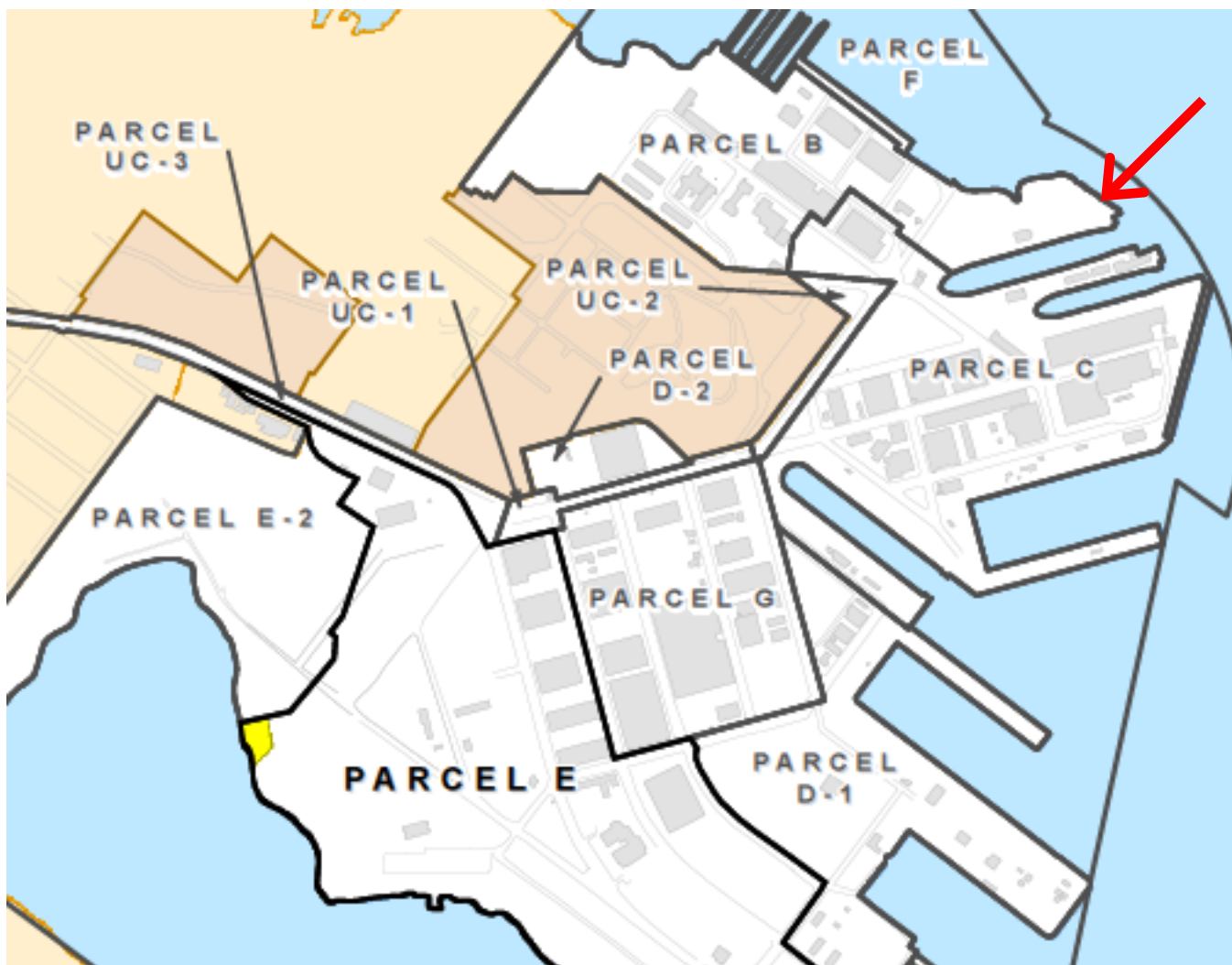
**Parcel B**  
**Additional Evaluation of Mercury in Groundwater**  
**at IR-26**  
**Hunters Point Naval Shipyard**  
**San Francisco, California**

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Contracted Support to NAVFAC BRAC PMO

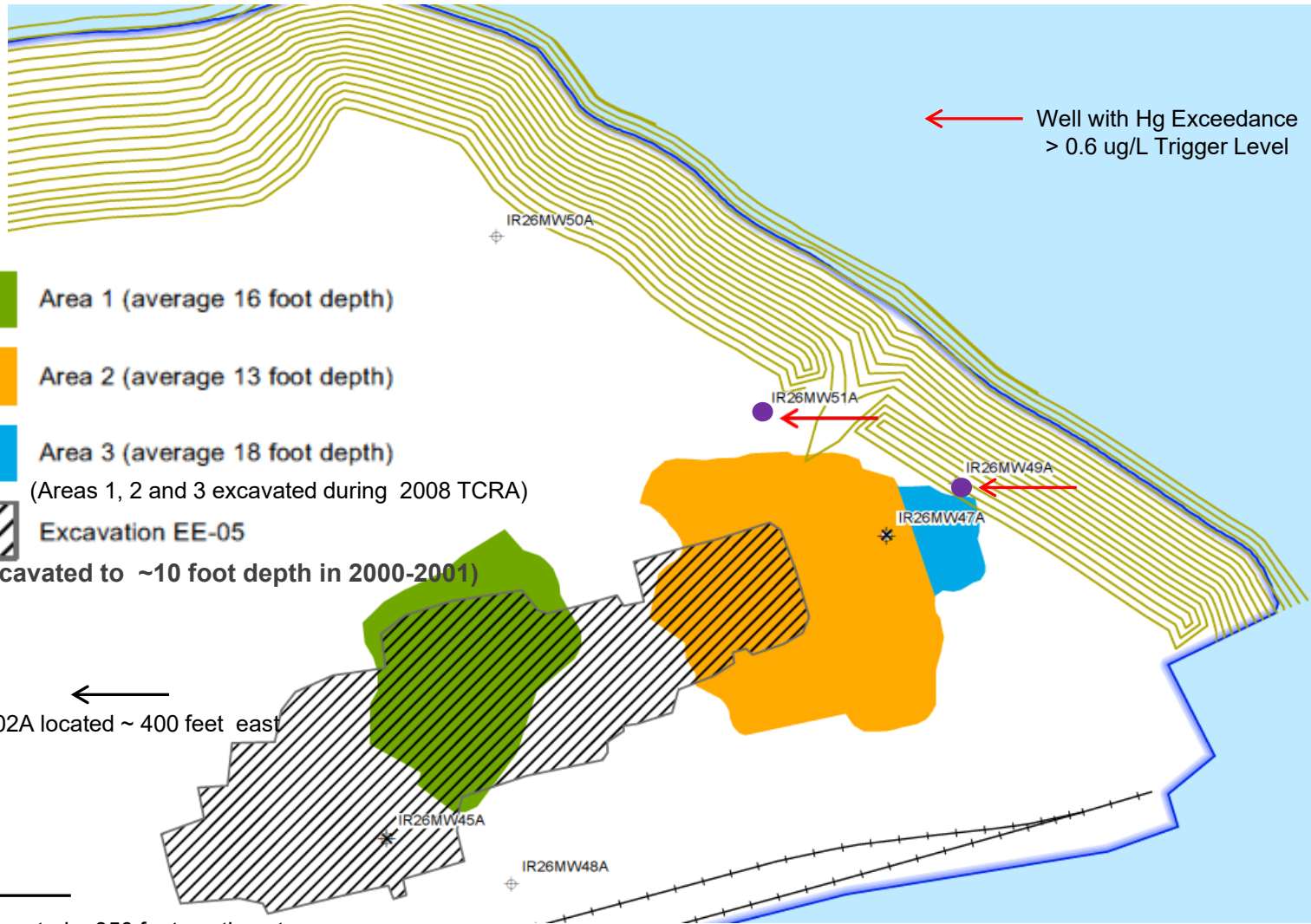
BCT Meeting March 27, 2014

- **Brief Discussion of Previous Excavation Work**
- **Summary of Historical Groundwater Analytical Results**
- **Proposed Field Work (Characterization, Tidal Study, and Slug Testing)**
- **Proposed Mass Flux Evaluation**
- **Schedule**

## Location of IR Site 26



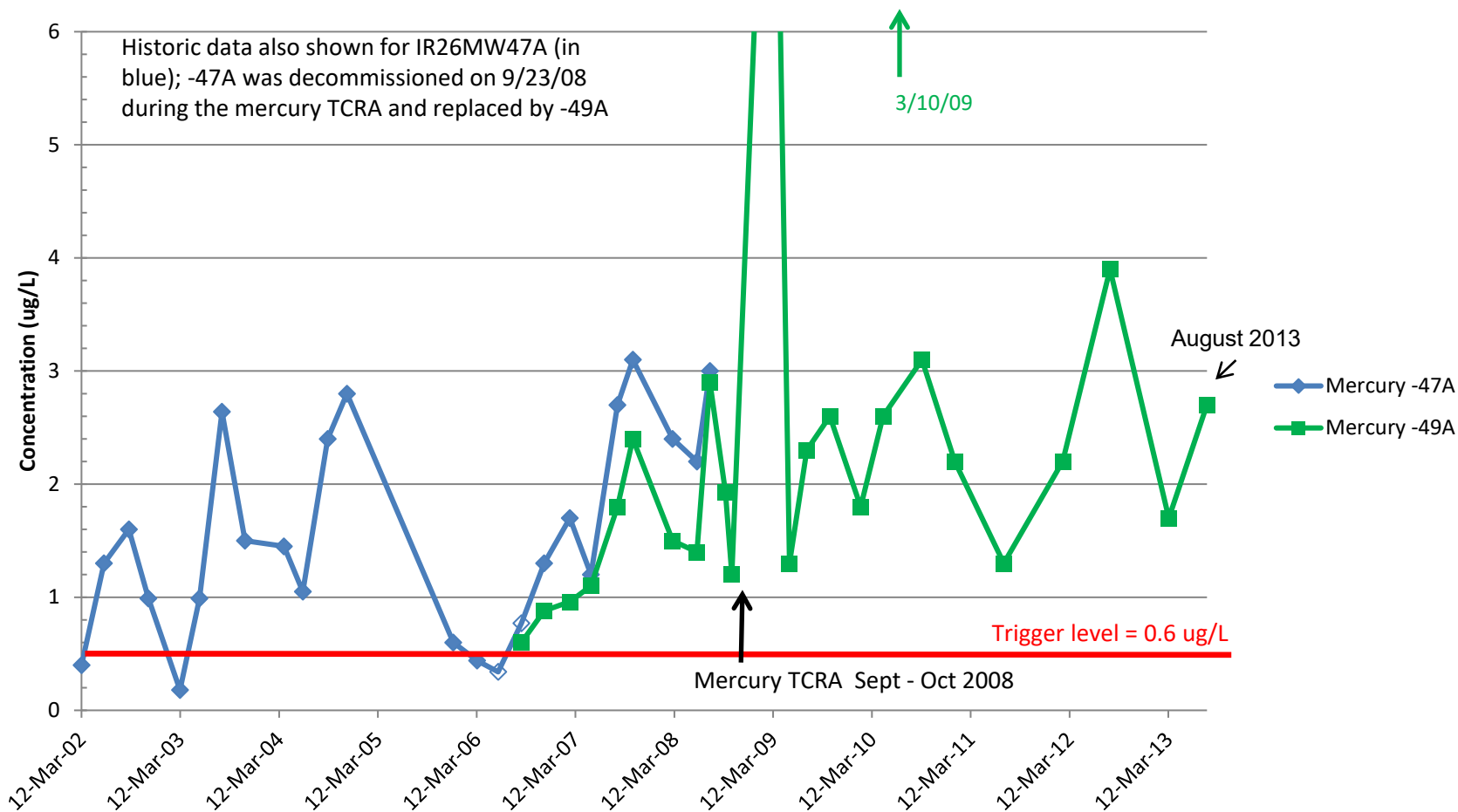
# Excavations at IR Site 26



# IR26MW49A Mercury Concentrations



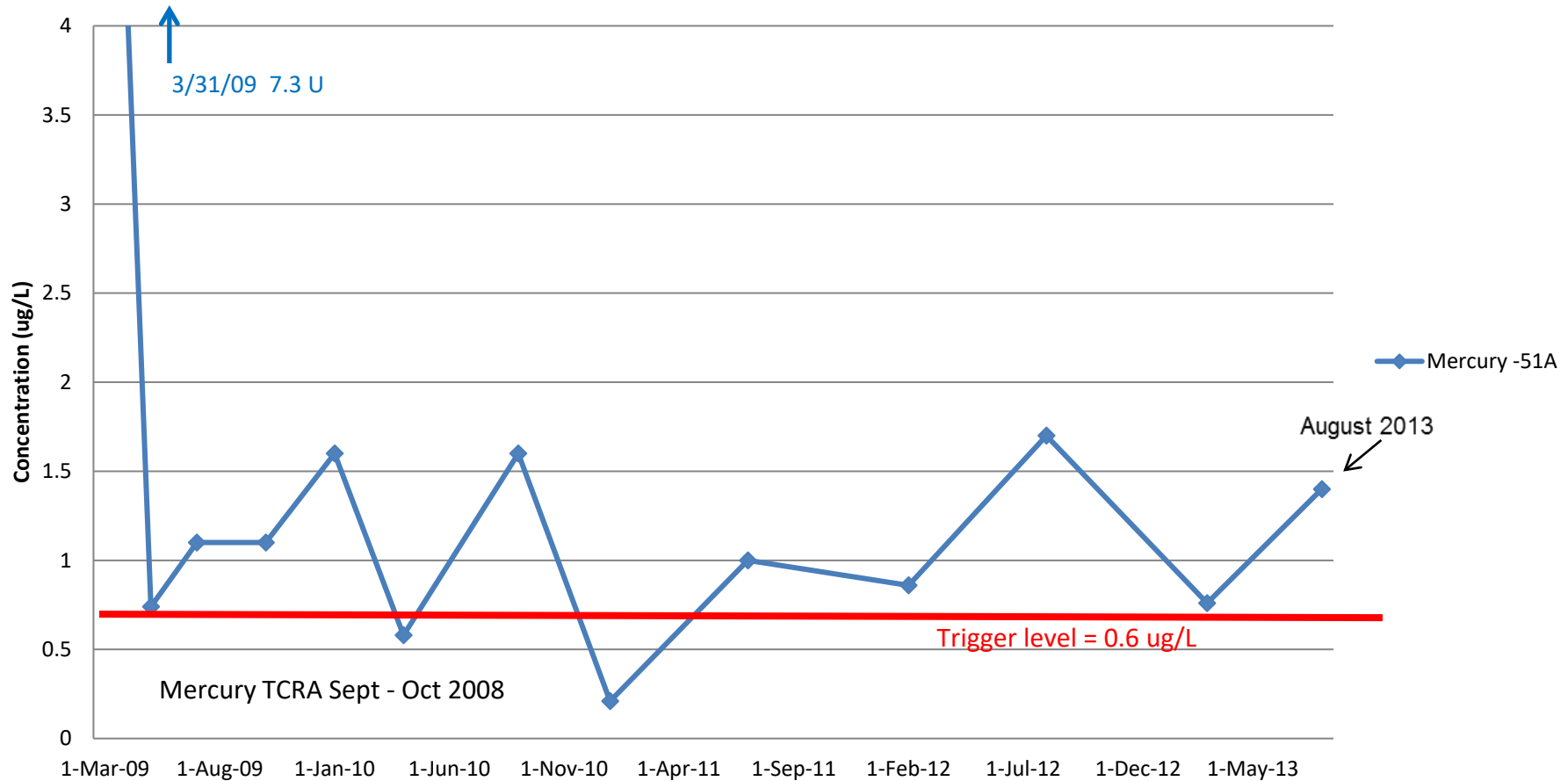
## Mercury at IR26MW49A



# IR26MW51A Mercury Concentrations



## Mercury at IR26MW51A



# Mercury Concentration Trends



- Since the October 2008 TCRA, mercury concentrations in samples from IR26MW49A have ranged between 1 and 4 ug/L and concentrations in IR26MW51A have ranged between 0.21 and 1.7 ug/L. Concentrations in IR26MW49A have been consistently above the 0.6 ug/L Trigger Level.
- Elevated mercury (2.7 ug/L) was also detected in a sample from Well PA50MW02A during the July 2013 sampling event. This well was sampled again in February 2014 – preliminary data show a mercury concentration of 0.59 ug/L, slightly below the Trigger Level.

## Objective(s) and Goal of Additional Evaluation at IR26



- The Navy conducted a November 25, 2013 call with the BCT to “brainstorm” the scope and objectives of the mercury evaluation. The group agreed that the objectives of this work should include:
  - Adequately characterizing the dissolved mercury concentrations
  - Determining if mercury is migrating to the Bay
  - Performing a mass flux evaluation to determine if remedial goals are being met
  
- The overall goal:
  - Estimate the mass discharge of mercury to the bay using the refined extent of contamination and the upgraded hydraulic parameters (gradient and conductivity) resulting from the field-based elements of the project.

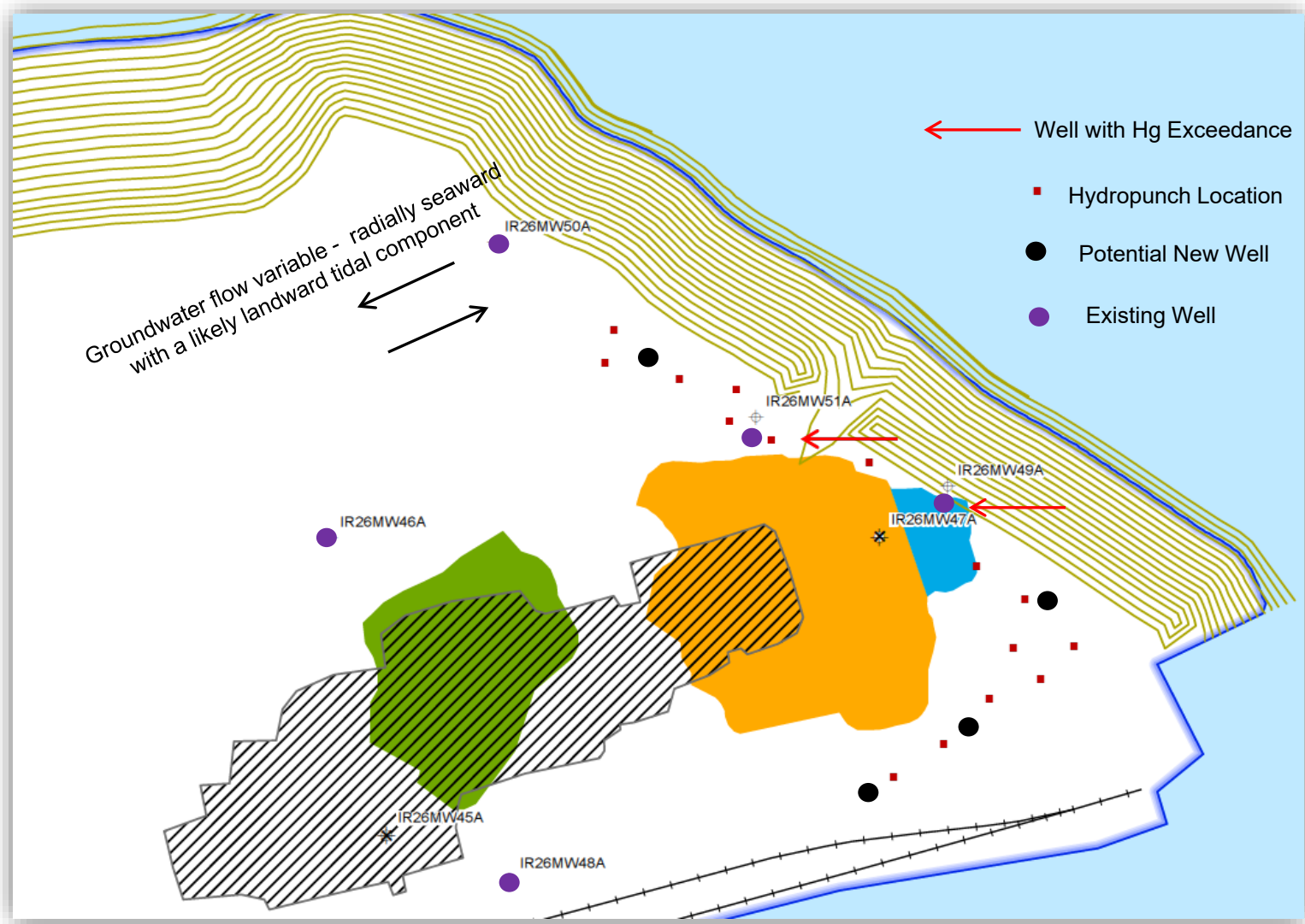


## Proposed Scope (Additional Characterization)



- Additional groundwater characterization is needed to evaluate the source and the extent of mercury in groundwater in the vicinity of wells IR26MW49A and IR26MW50A.
- Hydropunch borings drilled to the bedrock surface (~18-25 feet). Groundwater samples (two at each boring location) will be collected at ~10 ft bgs and on the bedrock surface to evaluate mercury concentrations vertically and laterally. Samples will be analyzed using EPA Method 1631E for mercury. Additionally, a portion of samples will be analyzed for methyl mercury by EPA Method 1630 for comparison.
- Based on hydropunch data, additional groundwater monitoring wells will be installed in the vicinity of wells IR26MW49A and IR26MW51A, and form one or two transects with existing wells in the IR26 dissolved mercury area.

# Example Hydropunch/Well Locations



## Proposed Scope (Tidal Fluctuation Study)



- Perform a tidal study to evaluate the effects of incoming high and low outgoing tides on mercury transport in groundwater.
- Water level transducers will be placed in 4 wells at varied or logarithmic distances from the Bay plus one in the Bay.
- Groundwater level data will be recorded over a 3-day period to evaluate diurnal tidal fluctuations in the elevated mercury area.
- The data shall be exported to an appropriate software package capable of generating tabular and graphical presentations illustrating the tidal influence at IR 26.

## Proposed Scope (Slug/Aquifer Testing)



- Because of a very limited data on hydraulic conductivity (K) values, slug testing shall be carried out on the new wells and five (5) existing wells at IR 26 to obtain a reasonable average of K.
- Slug testing will be accomplished by placing water level transducers in each the well being tested and placing a slug of known volume in each well to displace the water in the well casing.
- The water level transducers will record the water levels prior to introducing the slug and record the water level changes when the slug is introduced or withdrawn, and record the changes as the water level returns rises then declines toward equilibrium.
- The “delta h” data from each well will be exported to an appropriate software package such as AQTESOLV or an equivalent program that calculates K using Bouwer-Rice and other industry standard methods for estimating K.

## Proposed Scope (Mass Flux Evaluation)



- Perform a mass flux evaluation using additional analytical data and other data collected from the well field studies (tidal fluctuation, slug/aquifer testing, additional groundwater sampling).
- The evaluation shall be performed using guidance contained in the Interstate Technology & Regulatory Council (ITRC) guidance and other industry standard guidance for completing mass flux evaluations (ITRC, 2010).
- The previously described field activities are designed to support the transect approach to the mass flux evaluation described in the ITRC guidance.

- In summary, additional mercury evaluation will include:
  - Additional groundwater characterization using Hydropunch borings and additional wells
  - Sampling for mercury at varying depths in the water column
  - Performing a tidal fluctuation study
  - Performing slug testing to determine “K”
  - Performing a mass flux evaluation
  - Estimating mass discharge of mercury into the bay

# Preliminary Schedule



Activity	Date
Contract Award	April – May 2014
Draft Work Plan	July – August 2014
Field Work	September – October 2014
Draft Report	December 2014 – January 2015